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RESEARCH REQUIREMENTS AND TYPES OF INFORMATION NEEDED FOR AGRICULTURAL DEVELOPMENT PLANNING

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Research Requirements and Types of Information Needed for Agricultural Development Planning

by

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1. The purpose of planning is to arrive at a set of objectives considered desirable and possible in the process of development, to be achieved by a more thorough and coordinated use of resources. The general objectives are translated into specific goals and targets established for a certain period of years ahead. The means for attaining them are indicated with varying degrees of precision.

2. The precision can be greatest for the development activities that fall within the scope of direct government action. For such items e.g. construction of roads and major dams, the decisions about means for achieving goals are (or should be) reflected in a planned allocation of the government expenditure over the period of the plan. In economies where private enterprise is important, much of the activity required will have to be undertaken by private agencies or individuals. In this case, the formulation of a national development plan will entail not only a program of direct government action, but also a series of measures for guiding the decisions of private producers in conformity with the basic objectives and targets.

3. In the planning of agricultural development in low-income countries this two-pronged approach is particularly important. In such countries agriculture is typically organized in small family units, although in some cases there are also large estates. The latter are usually well oriented towards development. In the predominant small-holdings group, it is the production decisions of the heads of farm families or of tribal leaders that determine whether and how fast traditional farming methods give way to improved techniques, and so whether the plan targets are reached on time or not. Agricultural plans must include measures that impact the farmers in the village, changing the environment in such a way that they are encouraged, induced, convinced, enabled or taught to make new production decisions that are in line with the national objectives. However, in many such countries the capacity for private investment in agriculture is too small; and the capacity for cooperative action so weak, that the government has to play a strong direct role. This is especially the case when large scale works are required to overcome basic resource limitations e.g. the provision of irrigation water in arid areas.

4. Whatever the appropriate combination of private and public investment, the planning of agricultural development does not proceed in a vacuum but in an economy already functioning. Planning is a matter of bringing about changes in the tempo and/or distribution of the current production effort. Decisions have to be made as to the direction and amount of the changes to be sought, and as to the means to be employed for influencing the production process in the manner desired.

5. It follows that for the planning of agricultural development, information is required on three counts: (a) to reveal and evaluate the resources currently used and potentially available for agricultural production; (b) to increase understanding of the functioning of the agricultural sector and the problems being encountered by producers; and (c) to enable quantitative relationships to be applied in the planning process, e.g. as between inputs and outputs, costs and benefits or between different sectors of the economy. There is probably no clear distinction between these three purposes, all of which may be served by one type of research. However, the priorities may differ for different purposes. For this paper the data needed will be considered in relation to the planning process.

Continuity of research

6. The first point to establish is that the planning of agricultural development cannot wait on the perfection of the data. In developing countries, and even in advanced countries, there are always deficiencies in the available data. It is important to initiate the process of planning, assembling the information available in relation to each successive step, and taking the most rational decisions possible. Note should be taken in passing of the gaps in the data and the optimum amount of resources should be allocated under the plan to research designed to fill them, with a view to the improvement of later planning efforts.

The general setting

7. A useful first step in the agricultural planning process could be an appraisal in general terms of the role of agriculture in the economy. This should include an estimate of the extent of demands likely to be made upon the rural sector by the general objectives of the plan, and the impact of the rural sector on the plan as a whole. If there has been a previous plan, its implementation should be critically appraised, and the general obstacles to agricultural development identified. Any long range factors to be taken into account should be noted. More detailed analysis would follow.

Estimation of demand and future requirements of agricultural products

8. This should be an early step in the agricultural planning process. At this stage the aim is to assess the quantities of the various agricultural products that would be needed during each year and by the end of the period of the plan, to satisfy the overall objectives and targets of the plan, including feasible improvements in nutritional levels.

9. To project the domestic demand for food with some degree of precision, information is needed on the size of the population and its rate of increase. If there are groups of population with very different food habits, these data should be sought for each main group likely to be affected under the plan. In this connection it is most important to consider the farm population separately,

1) Including changes in the proportions of farm and non-farm population.

but there may also be significant differences in food patterns between different agricultural zones within the country.

10. The rate of increase in national and per caput income being sought will be known from the overall framework of the plan. This will affect the rate of increase in food consumption, but not all foods will be affected in the same way. For more precise forecasting, data are needed on income elasticities of demand for different foods, or the relationships between increase of personal incomes and increase in demand. Then, if the present levels of food consumption are known, the amounts that will be needed in the future to satisfy demand without price changes can be predicted. Note should also be taken of the gaps between present levels of consumption and nutritionally desirable standards and of proposed measures for nutrition education and improvement, so that allowance can be made for changes that may result in the consumption of particular foods.

11. With regard to agricultural raw materials required for domestic industries, data would be needed on the impact of rising incomes on demand for the finished products, and on the technical coefficients of the industries . By applying this information to current usage and consumption, the future requirements of non-food products to be produced by the agricultural sector could be estimated.

12. It would then be useful to attempt, from looking at past records, a preliminary assessment as to how much of the total projected requirements of agricultural products would need to be imported, or what surplus could be available for export. This should give a first idea of the production targets for domestic agriculture. These first ideas might have to be changed in the light of overriding national targets for saving or earning foreign exchange, or of studies of the prospects for buying or selling in foreign markets, or later studies of domestic production possibilities.

13. It will be clear that a great deal of careful economic research is already required before planning activities can be carried to this stage with any degree of precision. Surveys on food consumption and nutrition are basic. They should be conducted for representative samples of farm households and urban households, and for different regions and socio-economic groups if necessary. They should preferably include data on food expenditures or be combined with household budget enquiries. This would provide data on food consumption levels and patterns and expenditure at different income levels. From these could be derived the coefficients of income elasticity of demand for different products of agriculture, and a good picture of the nutritional level of the population as a whole. Special diet and nutrition surveys of the most vulnerable groups of the population would reveal special nutritional problems. Surveys of the current and expected technical coefficients of main industries using agricultural raw materials would also be desirable for projections of future requirements of such materials. Careful reviews of the likely future demand overseas for agricultural exports are essential for primary exporting countries.

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2 . i.e. the amount of raw material required per unit of finished product.

3 . In countries undertaking overall planning, much of this work would be done in the planning unit concerned with the industrial sector.

4 . The industrial planning units would be most directly concerned with these studies.

14. Attempts to project demand for agricultural products should begin, even in the absence of the above aids to precision. In the simplest case, much can be learned about future needs from a study of the trends in imports, exports and prices, based on statistics of foreign trade which are available in every country.

Projections of Production of Agricultural Commodities

15. The next step could be to examine the production prospects in the agricultural sector. The starting point would normally be a study of the present pattern of agricultural production. As far as possible this would be done by more or less homogeneous agricultural zones within the country, to permit the more rational projection of output zone by zone.

16. This is a stage where the greater the amount of scientific information available about the functioning of the agricultural economy, down to the individual producer, the more effective the planning can be.

17. The first need is for up-to-date statistics of agricultural production, showing area planted with each main crop, numbers of livestock of various classes, and output of all main products. Data on the input side would be particularly useful but are harder to obtain, e.g. labour force available, tools, equipment, fertilizers and credit used, in addition to land. Information on the number and sizes of farms in different zones, the income levels of farm families, actual farming systems, and on the economic and institutional environment of the farmers is all extremely valuable in the planning process.

18. Agricultural statistics are a basic need. In their absence, quantitative planning of agriculture is severely limited. Rough estimates may be better than nothing, and may permit planning to begin. A national agricultural census should be undertaken on lines recommended by FAO to lead to or supplement the annual collection of agricultural statistics. The progressive improvement of such statistics, in coverage and reliability, should be provided for in successive plans.

19. To build up a body of scientific knowledge about agricultural production and the factors affecting it, research should be progressively developed on both the physical basis and the economics of farming. A map of current land use, however fragmentary in the beginning, is a useful starting point. It can provide a framework for research on the physical resources (topography, climate, vegetation including forests, soils, water) as well as the economic environment of agriculture (land tenure, farm sizes, markets, farming systems). The coordinated progress of such research can lead to the definition of the main farming regions that should be differentiated within the country, and the gradual preparation of maps of land use capabilities, which may be different from the current pattern of land use. Physical resource surveys are obviously needed for areas whose potential productivity under various agricultural uses is largely unknown, before their development is planned.

20. Farm management research has special usefulness. A program of farm management studies designed to record and analyse the patterns of input and output (including farm expenditure and income) on representative samples of farms in the main farming regions would be particularly helpful. Such studies would enable the factors of farm organization and management and of rural economy associated with better than average productivity (or worse than average) to be identified. Additional research projects in land tenure, farm credit, marketing and farm prices might be needed to elucidate further some of the problems or potentialities revealed. Such farm management studies repeated at intervals

of several years would provide a picture of the changes taking place in the main farming zones of the country and of the results being achieved and problems experienced by the producers.

21. It must be recognized that in most tropical developing countries only the merest beginnings have been made in the above types of research at the farm and village level. The information which such studies could provide would enable more effective agricultural development measures to be selected in such countries.

22. In the light of such statistics and research results as are available, projections should be attempted of the current trends of production of main commodities during the period of the plan. Allowances should be made as far as possible for any new programs and policies that have been or are to be started. By comparing these simple projections of production with the projections of demand (corrected for assumed imports and exports), it should be possible to see where special efforts are needed to modify the current trends of output.

The selection of development measures

23. This is a continuation of the previous step. The very concept of planning implies that current trends and patterns of production have to be changed. In the light of the national objectives and the needs of the sector, decisions have to be reached about the precise changes that are necessary, and the measures (investments) needed to bring them about. The choice of development measures is the hard core of planning.

24. In FAO we have come to recognize four types of government programs and policies for influencing agricultural development, as follows:

(a) measures which can directly increase production

(i) provision of material inputs, e.g. fertilizer and manures, improved seeds, irrigation, land development;

(ii) measures for improvement of efficiency, e.g. research, extension, improved agricultural practices, better farm management (some of these measures may entail more material inputs as well);

(b) measures which can create favourable conditions for farmers' decisions to increase production or improve productivity

(iii) provision of economic incentives, e.g. assured prices to producers, subsidies on the cost of improved inputs;

(iv) institutional reforms, e.g. land reforms, control of usury, institutional credit, improvement of marketing, service cooperatives.

25. The aim of planning is to select the combination of measures and projects which, in the circumstances of the particular country or sub-region, will produce the greatest result in terms of the national objectives under the plan, with the utmost economy in the use of the scarce resources available. In this essential phase of planning it is necessary to assess the relative costs (in terms of scarce resources) and benefits (e.g. additional output) for a whole series of proposed or possible measures and projects. In the ideal case a vast amount of accumulated data on technical, engineering and economic aspects of agriculture are needed. In practice in developing

countries the economic data are most commonly absent or insufficient.

26. It is essentially a process of economic analysis - the choice among alternative ways of achieving definite goals under the discipline imposed by the severe limitation of means. How much additional development expenditure should be allocated to direct, physical measures in competition with less direct measures which encourage farmers to intensify their production efforts? Another choice is whether the resources should be spread over the whole sector, or concentrated in relatively favourable zones where rapid development could "spearhead" economic progress for the whole economy. It is important to assess not only the cost of alternative inputs, projects and measures but also the returns to be expected from them, singly or in combination. If this information is not available, the risk of wasting scarce resources by allocation to less productive uses is great.

27. The previously mentioned studies of land use, descriptions of the main farming systems and surveys of farm organization and management are basic sources of vital data for planning at this stage also. Especially valuable are analyses of the responses to material inputs on individual farms e.g. fertilizers and irrigation in progressive amounts, singly, together, and combined with other inputs such as better seed and disease control measures, applied to different crops in different regions of the country. Studies of farm labour and farm employment in different systems of farming are also useful. This type of research should, if possible, be pushed to the point where quantitative relationships between inputs and outputs can be derived, as working tools of planning. Such tools should be used with caution and due allowance for the role of management and especially of improvements in management.

28. To provide a basis for assessing the likely response to economic measures and institutional reforms, research should be conducted at farm and village level on marketing channels and prices actually received by farmers for their products and prices paid for fertilizers and other inputs. The results of such research will be more informative if supplemented by field studies of farmers' indebtedness and sources of credit. Studies of the economic behaviour of farmers, particularly in relation to incentives (e.g. assured prices), disincentives (e.g. high share rents) and receptivity to new improved techniques, would also be highly relevant.

29. The planning in this stage is likely to become focussed on several major development schemes, such as fertilizer or processing factories, multipurpose irrigation and power projects or land development and settlement schemes, among which choices have to be made. The economic appraisal of these and other individual projects in developing countries still leaves much to be desired. Should current price relationships be projected or replaced by some concept of "shadow prices"? Can indirect benefits be ignored? Research and case studies to elucidate principles and to elaborate methodology would contribute very greatly to the more rational selection of development projects.

Successive approximations and the final plan

30. After completing the projections of agricultural production, with modifications resulting from the selection of development measures, the planning process should arrive at preliminary targets for the agricultural sector. There will be a list of projects, all considered technically feasible and economically efficient, and more or less in line with the national goals and resource availabilities. The estimated costs and returns will be shown.

31. It will inevitably be found that the first results do not balance in some important respects with the requirements of the national plan or of other sectors, e.g. as regards the targets of national income or rate of investment, the availability of foreign exchange and foreign aid, or the development of industries (processing plants, fertilizer or equipment factories). Adjustments will have to be made in certain parts of the plan, with matching adjustments elsewhere. Thus a series of successive approximations will have to be gone through. During this process the agricultural sector and its projects will come under repeated review. To the tests of efficiency will be added those of consistency, and some desirable projects may have to be eliminated or postponed because of an overall shortage of resources.

32. It is not unusual for the agricultural plan to suffer in this stage, because of weak economic analysis and a lack of supporting data. The types of research required are mainly those already indicated, carried out with greater depth or quantitative refinement. The tools of consistency analysis needed include, at the elementary level, resources budgeting or the balancing of all proposed usages of each scarce resource against estimated total supplies. At a much more sophisticated level, economic research leading to the preparation of input-output tables will be helpful.

33. When the matching adjustments are completed in a consistent framework for the overall national plan, the final shape of the agricultural plan will emerge, with production targets in line with projected demands and with the desirable levels and pattern of investment determined.

Implementation and review of plans

34. Implementation is the supreme test of the plan. Moreover, conditions change, affecting the availability of resources in any year. Reviews should therefore be undertaken annually and are an essential part of the planning process. Research and evaluative studies are required, but usually on an ad hoc basis. Certainly, it is important to analyse in depth the reasons for cases of notable failure or success in the implementation of plan projects, with a view to the improvement of subsequent plans. For this purpose the Government of India established, as a part of the Planning Commission, a permanent organization for program evaluation and research.

Perspective planning and long-term guidelines

35. Operational plans for economic and agricultural development usually cover a period of 4-6 years. As a guide to the general directions in which progress has to be made, some countries prepare a perspective plan, looking ahead 10 - 20 years. Examples are Ceylon, and Japan (10 years), India (25 years), U.S.S.R. (20 years). Such a long look ahead is particularly important in agriculture, since many of the changes that have to take place occur only slowly, and the returns on certain types of investment are a long time in coming. This is the case for forestry and tree crops, land use, development of new areas, soil conservation, large-scale irrigation, agricultural education, and the improvement of nutrition.

36. As in the preparation of short-term plans, projections are a basic element in perspective planning. The general approach and the data required are not different in principle from what has already been described. Since the projections are thrown much further ahead, however, the emphasis is on the broad outlines of change and development rather than on details. The perspective plan thus brings out and lays down the strategy or long-term guidelines for agricultural development, whereas the operational plan specifies the shorter-run tactics.

37. Seen in long-run perspective, questions of basic resources loom larger. Rapid population growth; the shift of employment from agriculture to industry; the changes in demand, food consumption and nutritional objectives that accompany a long period of rising incomes will entail major changes in resource use that should be foreseen and taken into account in agricultural planning. This emphasizes the need for basic surveys of land, forest and water (including fishery) resources, and maps of land-use capabilities. Such maps should be based on scientific description of the physical characteristics of the resources, with special reference to limitations or potential productivity. In perspective planning the physical features would have to be assessed in the light of projected economic and technological conditions affecting the production of particular commodities.

38. Many types of research already recommended will yield results that are highly relevant in this context. In addition to resource surveys, long range reviews of market demand, both domestic and export, are essential to guide the development of farming systems towards products in continuing demand. Farm management studies can reveal the factors of input, organization and technology associated with high productivity per hectare and per head, which must become the norms of the future, entailing vast changes in the structure of the rural economy as regards farm sizes, farm labour force, commercial supply and distribution of farm requisites and commercial marketing of farm products.

39. Perspective planning, even more than short-term planning, has no substance in the absence of technical research. Nevertheless, the problem of relative costs and returns from alternative uses of the agricultural resources, in relation to projected future needs, remains predominant. It will still be the main preoccupation in planning. The best possible judgements must be made in the light of the data and analyses available within the country, or in other comparable countries at similar stages of development. As already indicated, the gaps in knowledge, both technical and economic, required for better planning must be foreseen well ahead, and provision made for the needed research when allocating resources under the plan.

Reference

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